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GAS IN INDUSTRY

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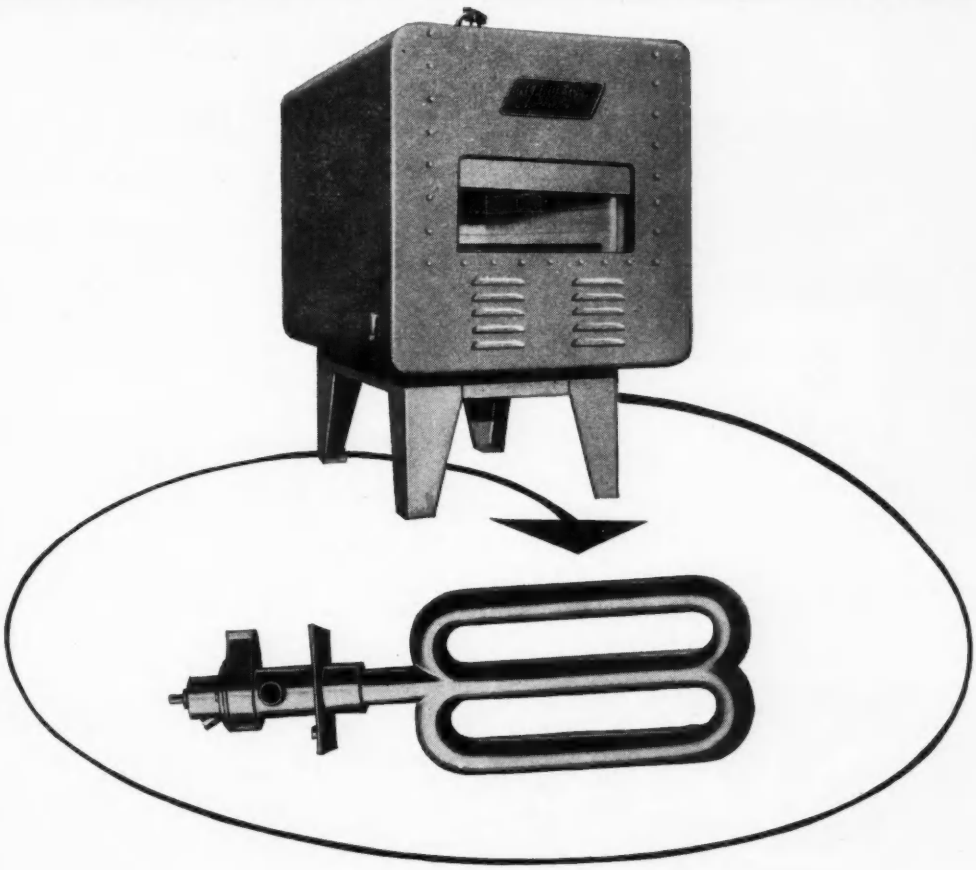

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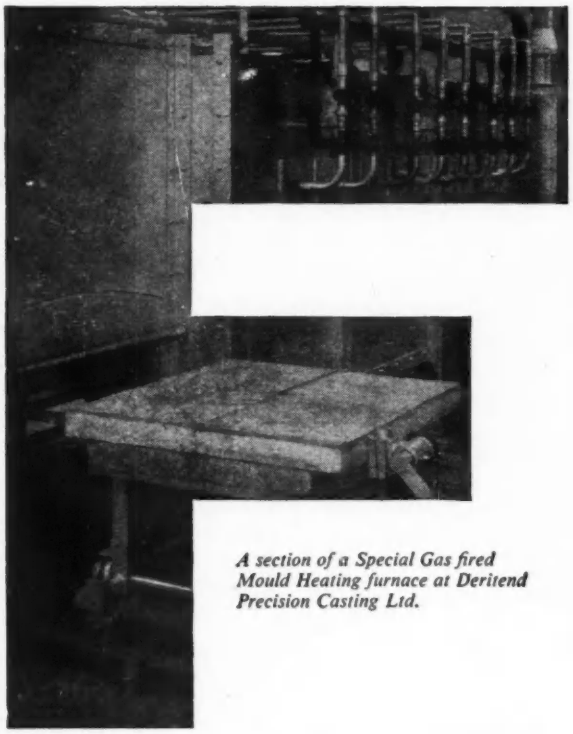

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FEATURES

BIRMINGHAM JEWELLERY CENTRE—WHERE CRAFTSMEN USE GAS.
By Eric Ford.

GAS HELPS TO RIPEN BANANAS.

A PROBLEM OVERCOME.

AIRLINE COOKS BY GAS.

'GAStronome' ASKS—SHOULD YOU SCRAP THAT FRYER?

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Editorial

Gas in the jewellery trade

IN our *Gas in Industry* supplement we try to show our readers how great and varied a field is open to gas as an industrial fuel, and this we attempt to do by describing in some detail the activities of manufacturing firms in many parts of the country. Often the most impressive are those employing very large gas-fired furnaces processing large ferrous metal forgings and other large components for the engineering industry. This month, however, we are going to the other extreme and are publishing an article on the use of gas in the jewellery trade.

Birmingham has been aptly named the 'City of 1,000 trades,' so it is not surprising perhaps, that it is to the jewellery quarter of this great manufacturing city that we should go to find yet another important consumer of gas.

Clearly the consumption of gas in the production of anything so delicate or intricate as a fine platinum brooch, or 'clip', a piece of silver tableware or a bishop's crozier, cannot compare with that used in heavy engineering, but when it is realised that the first high pressure main was laid to the jewellery quarter of Birmingham, it will be clear that this particular industry has been an important gas consumer for a number of years.

It will be clear also that the very fineness of the work demands a fuel like gas; a fuel that is extremely flexible in its use, can be brought to the work bench where it must always be to hand, and at the same time be capable of producing the high temperatures needed for many of the processes used.

Clearly for the jewellery trade, the fuel must be brought to the work in a very large number of cases, rather than the work to the fuel, though this is not invariably the case. The noble metals, platinum, gold and silver, need special care in both their heat and mechanical treatment, and being costly, especially gold and platinum, there must be as little loss of the metals as possible.

The melting point of platinum is particularly high and this demands a high standard of furnace design for its melting before it is cast. Care must be taken in avoiding loss of silver by oxidation, and great skill must be exercised in the alloying of these noble metals with the common non-ferrous metals in the production of the finely wrought objects we are accustomed to see displayed in high class jewellers' shops.

These precious metal alloys are made available to the manufacturing jeweller in the form of sheet of various gauges or fine wire, and it is in the fashioning of the individual pieces that gas must once more be called in to assist. The mechanical treatment of even such comparatively soft metals, as these alloys are, will radically affect their malleability, and therefore frequent annealing is necessary to preserve their workability.

Soldering plays a big part in the assembling of the many intricate parts of a diamond ring for instance, and often the type and melting point of the solder must be varied as the work proceeds, even though it is the same work-piece. Here again the flexibility of gas as a fuel is most valuable, and its ability to be used in the very finest and most accurately adjusted heating appliances, or blow-pipes, is of the utmost importance.

Birmingham jewellery centre — where craftsmen need gas

In Birmingham's famous jewellery quarter a craftsman uses a gas blow-pipe in silver soldering on a silver brush set at the works of H. Clifford Davis Ltd., Warstone Lane.

by Eric Ford

TO most people the name Birmingham conjures up pictures of huge factories and workshops turning out an unending stream of engineering components and finished equipment for customers all over the world.

It has always been the city's proud boast that everything required by modern industry, from heavy machine tools and cranes down to the smallest nut and bolt can be obtained from the wide variety of enterprises which give the capital of the Midlands one of the most varied industrial outputs of any city on the globe.

1,000 FIRMS

But the versatility does not end there, for Birmingham is also noted for the excellence of the jewellery which its craftsmen produce. The centre of this activity is the famous Birmingham jewellery quarter, where about 1,000 firms are engaged in the manufacture of all kinds of jewellery, from rings and cuff links to lucky charms and ecclesiastical plate.

Gas is widely used in many of the operations which have been developed through the years to ensure that the accumulated skill of centuries is matched by the latest techniques to produce articles of jewellery which are worthy of the traditions of one of the oldest crafts known to man.

All the firms are concentrated in one area of Birmingham, where the jewellers have their own church (St. Paul's) and where a well-known clock tower is the most familiar landmark.

In former days, the master jewellers occupied large houses in the district, using some of the rooms as workshops where, under the master's eye, the apprentices and craftsmen plied their skilful trades.

Today, many of the houses remain and have been turned into small factories, using modern methods to produce jewellery of the finest quality.

It is a fascinating experience to wander round this district, which comprises only a few streets, and to think of the skilled work in progress all around, using materials of great value to produce articles worth altogether many millions of pounds.

Birmingham's jewellers were among the first to recognise the value of gas as an industrial fuel and, in fact, the first high pressure main to be installed in the city was laid to the jewellery quarter. This old main, incidentally, is still there.

Most of the applications of gas are on a small scale, as would be expected from the nature of the delicate end-product. But although each individual application is a small one, there are so many of these applications that the total amount of gas supplied to the industry by the West Midlands Gas Board is considerable.

Indeed, gas is used at almost every stage, from the initial preparation of the precious metals to the final polishing of rings and gold plate.

For the raw materials of his trade, the jeweller requires the precious metals—silver, gold and platinum—and a wide variety of beautiful stones.

such as diamonds, rubies, opals and amethysts. The stones are bought in, ready cut, through the normal trade channels and the precious metals are purchased in the form of sheet or wire.

METALS MELTED

One of the sources of supply is the well-known firm of Johnson, Matthey & Co. Ltd., which has a large branch works in the jewellery quarter, where precious metals are melted, alloyed and processed to the form in which they are sold to the numerous firms.

Pure gold is received at Johnson, Matthey & Co. Ltd. in bar form and is first turned into small lumps called 'grain.' This has then to be alloyed with appropriate quantities of copper and/or other metals in order to give the gold the physical characteristics necessary for use in rings and other jewellery.

This is expressed in carats. Qualities used in the trade vary from 22 down to 9 carat gold, pure gold being 24 carat.

Melting is carried out in special gas-fired furnaces at Johnson, Matthey & Co. Ltd. works which is a large plant employing a considerable number of work people. The furnaces use gas at zero pressure and control the heat input by the air pressure only.

Operating temperatures when melting gold are in the range 1,000°-1,400°C., but for platinum temperatures of the order of 1,770°C. are needed. After melting, the molten material is poured into split moulds to produce bars of the correct shape.

In other parts of the works gold, silver and platinum are processed into the various forms required by the customer, such as sheet or wire, of various gauges. Various cold drawing, rolling and other processes are used.

One of the outstanding features of the jewellery trade is the extreme delicacy of much of the work. Consider, for example, the amount of detailed work which goes into the manufacture of a ring.

A close look at a diamond engagement ring will show that, in addition to the circular portion, there is the section which houses the stone, comprising a number of tiny components known to the trade by such names as the 'shoulder,' the 'claw' and the 'disc.'

PARTS CAST

Formerly, all these delicate components had to be made laboriously by hand, but today the basic structure of the ring can be cast (in gold or platinum).

Although a great deal of skill is still needed in the assembly and finishing of the ring, the introduction of new casting techniques has reduced the time taken to make a ring from about five or six hours to something like 35 minutes, without any loss in the artistry of the final product.

As the casting process is a very skilled operation, it is carried out by a firm which specialises in this type of work. The Prima Casting Company Ltd. is well-known in this field in the Birmingham jewellery quarter, and they use gas in their casting process which is known as the 'lost wax' or 'investment' process.

In the 'lost wax' process, as employed by the Birmingham firm of Prima Castings Ltd., the master copy is first embedded in rubber and vulcanised. The copy is then removed from the rubber, leaving a perfect mould.

Shown here are some castings of rings, produced by Prima Castings Ltd., using the 'lost wax' process. Note the accuracy of the work, impossible to achieve by any other casting process. Gas is used in this operation.

Although this process, in its basic form, is actually centuries old, it has only been applied in industry comparatively recently.

It has been used for casting jewellery components only for about 15 years, but it is said to be revolutionising the industry since the delicate components required cannot be cast accurately enough by any other method, particularly as gold and platinum are difficult to cast.

A meticulously accurate master copy has first to be made and this will normally be produced by a master craftsman at the firm which requires the casting. This master copy is then placed in latex rubber in a mould box, which is placed in a vulcaniser when, under heat, the rubber vulcanises into a solid block.

This is next cut in half and the master copy removed, leaving a mould

A craftsman working on a Monstrance at the works of A. Edward Jones Ltd., Birmingham. The chasing of this beautiful silverware is all done by hand. Gas is used for annealing purposes at several stages during the work.

which is an exact impression of it. The master copy is mounted on a 'handle' (known as a 'sprue') which, when reproduced in the mould, forms a run-in for the molten wax which is injected into the mould under pressure as the next stage in the process. The wax is melted in a wax pot held at about 60°F.

Time is allowed for the wax to solidify in the mould, after which the mould is opened and a perfect wax replica of the eventual casting is obtained. A number of these wax replicas are next set up on a rubber base forming the bottom of a metal can.

INVESTMENT

The can is then filled with investment powder, which has been previously mixed to the correct consistency with water. The investment material therefore flows down to fill the gap between the rows of wax replicas.

The can is placed under a sealed glass dome and vacuum applied. Any air trapped in the investment material is thus drawn off to ensure that the material is packed tightly round the wax.

Now the rubber base is broken away, exposing the ends of the 'sprues' of the wax replicas, which will act as the lead-in for the subsequent casting process.

Cans of investment material, with the wax replicas inside them, are then loaded into gas-fired furnaces and the temperature slowly raised to about 700°C. The equipment used for this purpose by Prima Casting Co. Ltd. was supplied by Fuel Furnaces Ltd.

CAVITIES FILLED

During the heating cycle, the investment material hardens and the wax melts away to nothing, leaving cavities in the solid block of exactly the shape required. These have next to be filled with molten gold or platinum as the case may be.

An ingenious machine has been devised for this purpose. The can of hardened investment material is placed in the machine and connected to a supply of molten metal.

The metal, incidentally, has been melted by gas gun. The machine then swings round and the molten metal is forced into every cavity by centrifugal force, thus ensuring that every nook and cranny is filled.

When the metal has cooled, it is a simple matter to break away the investment material to reveal the castings, the quality of which is very good.

In addition to castings of gold and platinum for rings, other items which are cast at the Prima Casting Co. Ltd. include embossed designs for uniform buttons and lucky charms in the form of such models as tiny vintage cars in exquisite detail.

One Birmingham firm which makes use of castings produced in this way is Steele & Dolphin Ltd., a firm which was founded in 1946 and has made such rapid strides that it is now one of the leading firms in the jewellery quarter, specialising in rings of all kinds, but also producing some other items, such as gold cuff links.

SKILLED WORK

Although the introduction of castings for many of the parts of rings has reduced the amount of work required, there remains the problem of assembling the parts and the 'setting' of the stones. This is highly skilled work which is the more difficult on account of the very small components used.

Gas is required for soldering operations and many gas torches are in use in the workshops. In soldering the different parts, five or more types of solder are used, each with a different melting point.

The solders are used in descending order of melting points so that the solder applied in an earlier operation does not melt in any subsequent application of heat.

Anyone who has thought of industrial gas in terms of huge installations for heat treatment or paint stoving, will hardly be able to visualise the extreme delicacy of the work carried on at Steele & Dolphin Ltd. The soldering operations, for example, demand the utmost precision on the part of the craftsman, who has his own gas burner beside him on the bench.

BY BLOW-PIPE

When an air supply is needed, the craftsman places a small blow-pipe in his mouth and blows the gas flame on to the work. In this way, not only has the man the most sensitive means of control but he also has his hands free to manipulate the solder, flux and the workpiece.

Many operations besides soldering have to be carried out and all demand a craftsman's skill. The setting of the stones, for example, has to be done with extreme care, for the stone must not work free from the 'grains' of platinum which hold it in place and it must also be set in such a way that it shows up to best advantage in the ring.

All metal parts of rings have to be polished by various processes and in the case of signet rings the engraving of initials or other designs is all done by hand.

In the course of all this work small quantities of gold are rubbed off the rings and although the amount thus removed is almost infinitesimal from a single ring, the amount yielded from an output of the size of Steele & Dolphin is sufficient to make recovery an urgent necessity.

All sweepings from benches and floors are therefore treated in a high temperature gold recovery furnace which is gas-fired. This comprises a small pot, into which the sweepings are put and which is contained inside another pot.

SPECIAL BURNERS

The air blast burners are of special design by the West Midlands Gas Board and temperatures of up to 1,550°C. are obtained, which is well above the melting point of gold.

Although Steele & Dolphin is a relatively young firm, in comparison with other jewellers, a fine tradition has already been built up. The firm's products are clearly worthy of the high esteem in which it is held in the trade.

Work in Birmingham's jewellery quarter covers a wide range and includes such items as fine silverware for the table, cups and trophies for sporting and other events and dressing table sets.

The use of gas in this connection can be illustrated by the firm of H. Clifford Davis Ltd., where gas is used for such purposes as annealing and soldering.

Craftsman uses a mouth blow-pipe and a gas flame in soldering 18-carat gold and platinum diamond rings for Steele and Dolphin Ltd., Vyse Street, Birmingham.

Consider, for example, the manufacture of a receptacle, such as a sugar basin, in silver. This commences as a sheet of metal which is gradually brought down to its final shape by stamping in a die. Some five operations will be needed in order to reach the final shape and annealing may be necessary on three or four occasions during this process.

A gas blow-pipe is used by a craftsman to solder the handle on a silver tankard at the works of H. Clifford Davis Ltd., Warstone Lane, Birmingham.

SKILL PARAMOUNT

Annealing is effected by gas and air torches of standard design but the amount and frequency of the annealing is determined by the skill and experience of the craftsman, who also decides on which portion of the workpiece the flame should be directed. Here, as in so many operations throughout the jewellery trade, the skill of the craftsman is paramount.

Not all the items are shaped in this way. Some are spun on lathes, and in this case also frequent annealing is necessary.

Many of the items require handles and ornamental stampings to be fixed to them. These are soldered on, using gas torches. Some beautiful work is produced by H. Clifford Davis Ltd., who add to Britain's overseas earnings by exporting about one-third of their annual output.

As the manufacture of this type of ware is a specialised business, it is perhaps hardly surprising that the finishing processes should be handled by another firm and, in fact, the embellishment of some of the items produced by one firm is often carried out by another specialist company.

'IN ROUGH'

W. W. Godwin & Son Ltd. is one such Company which receives such items as high quality silver dressing table sets, cigarette lighters and such goods 'in the rough' and polishes and decorates them.

Typical of the high class work carried out by this firm is the finishing of these objects with coloured designs and pictures. In this type of work, it is not only important that the picture itself shall be artistically done, but it must also retain its original colours and not rub off in use. Both these ends are achieved by firing the product at frequent intervals in a gas-fired furnace.

It is first necessary to provide a suitable base for the colour, and for this purpose, a solution of powdered glass is first applied to the silver and fired in the furnace.

After firing, this base is then painted with the first coat of the design and again fired. Various painting operations are needed, depending on the nature of the design, and firing takes place after each painting.

DESIGN PAINTING

The designs, which in fact are miniature works of art, are painted on by hand by skilled girl artists who have learned their craft at art school.

Some of the most effective designs feature bunches of flowers and outdoor scenes, but the range of illustrations prepared in this manner by W. W. Godwin & Son is extremely wide.

There may have to be as many as seven firings during the painting stage and when this is completed, the whole is then coated with another 'layer' of the powdered glass solution and given a final firing.

In effect, therefore, the finish on these articles comprises a glass-paint-glass 'sandwich.'

Firing takes place at about 650°C., the length of time depending on the nature of the job. Here again, as throughout the jewellery industry, the skill of the craftsman is the most important factor. The furnace used for this work is a small gas-fired muffle, with working chamber dimensions of about 1 ft. by 1 ft. 6 in.

Work of a quite different nature is carried out by A. Edward Jones Ltd., who specialise in all kinds of ecclesiastical metal work, ranging from silver altar crosses, Communion vessels and Monstrances to bishops' croziers.

This is highly specialised work, requiring a very high standard of craftsmanship and design and including a number of processes, such as spinning, hand beating, chasing and embossing and soldering. All these processes demand the continual use of gas.

FLOW PROCESSES

This is an up-to-date firm and, despite the 'one-off' nature of much of its work, a successful attempt has been made to introduce flow processes wherever possible.

Since much of the work of A. Edward Jones Ltd. is done to the order of a particular church, the making of the original design is an important factor, and this is conceived in terms of the setting in which it will eventually be placed in the church.

Since no two churches are alike, it is clear that the preparation of the design requires great skill and taste. The design is submitted to the customer and, when approved, the work begins.

Most of the items produced contain at least one circular component, and these are made on lathes in the spinning department, which may be considered as the first operation in the production line.

Annealing is necessary at varying intervals during spinning, the frequency and duration of the annealing depending on the nature of the product. A gas torch is used for annealing purposes.

All the items from the spinning department either require additional components (such as handles, bases and the like) or have themselves to be incorporated into large articles.

In the making-up department, any additional items are soldered on, with hard or soft solder as required, using gas torches.

Some of the most intricate work at A. Edward Jones Ltd. is done in the chasing and embossing department where, at the time of the visit, a bishop's crozier was being completed.

Parts of the crozier which require to be chased are fixed to a wooden board with pitch and the intricate design is chased by hand.

Here is skill of a very high order indeed and the very experienced craftsman engaged on this work is an artist in his own right.

Some interesting equipment is used, including the 'snarling iron' which can be introduced into positions which it is not possible to reach with ordinary tools.

ANNEALING

At frequent intervals during the chasing operations, annealing is necessary and gas is used for this purpose.

Silver and gold plating is carried out in the plating department; where heat is required in these operations gas has been selected as the most convenient form of fuel.

The plating lines have been laid out neatly with an eye to the most efficient running of the process. The various tanks are carefully sited to permit ease of movement of the items from one to another.

I.C.I. trichloroethylene gas-heated degreasers are used where required.

Several new techniques have been introduced by A. Edward Jones Ltd., in their plating department. For example, they have commenced using a new solution of the latest type in their silver plating line. This has proved to be both quicker and capable of giving better quality work.

Gold plating is carried out in a gas-heated plating line. The procedure requires a temperature of about 120°F. An interesting innovation here is the introduction of a PVC tank with water jacket which is also gas fired.

The tank has not been in use very long but the firm reports that it has proved entirely satisfactory.

A. Edward Jones Ltd. is an enterprising firm, which is building up a thriving export trade, particularly in the United States. The firm values the part which gas plays in its operations, from gas annealing and soldering to the use of gas muffles.

LONG SERVICE

In fact, all the firms in Birmingham's jewellery quarter are keenly alive to the importance of gas in their industry. The West Midlands Gas Board has been supplying the jewellery quarter with gas—and the service which goes with it—for a long time now and the Board's industrial section has built up a wide knowledge of the requirements of the industry.

This enables the Board to give the best possible service to an industry which makes use of this flexible fuel to produce jewellery of all kinds which is appreciated wherever fine quality of production and elegance of appearance are highly prized.

GAS HELPS TO RIPEN BANANAS

THE most modern banana ripening and distribution centre in Europe has been put into use at The Plains, Airdrie, by Geest Industries Ltd., who operate nine centres on this work throughout Great Britain.

Banana ships dock at Barry (South Wales) or Preston (Lancashire) and the imported bananas are then distributed in insulated vans by fast freight trains to the various centres for ripening against market requirements.

Something like one-and-a-quarter million bananas are sent to the Airdrie depot each week to be ripened, cut, packed and distributed.

Controlled conditions

Layout of the depot has been designed to provide controlled environmental conditions at every stage of the operation. This is essential since no two stems of bananas ripen in exactly the same way, even individual hands on the same stem showing variations.

Ripening techniques have been evolved to permit mass handling, but within that fact there is scope for a major amount of supervision by experienced staff so that stems and hands can be treated individually as required. For that reason the planning of the Airdrie centre relies on staff supervision as well as on instrumental controls and tested ripening routines.

The depot has been built adjoining the main rail line so that insulated vans can be brought in under cover to the railward bay through roller shutter doors, giving protection to the stems as they are unloaded on to the continuous overhead conveyor.

This leads the stems into the reception area where two protective layers, one of polyethylene film, and one of paper wadding can be stripped and the bananas sent on to the ripening chambers.

At The Plains, Airdrie, in Europe's most modern ripening centre, over 1,250,000 bananas are ripened, cut and packed every week. Overhead gas heaters cover this area.

These occupy two floors in the central bay, continuous with the cutting and packing section, so that the bananas are directly in line with that section, after ripening, when they are brought out on the overhead conveyor.

Coloured wrappings

In the cutting, grading and packing section, the bananas are packed in colour-identified wraps and boxed, to be delivered by roller conveyors to the pallets which are then transferred to the transport bay for road delivery.

This whole section is laid out on work flow lines, giving each worker the minimum of travel and effort, and at the same time giving maximum control of grading, cutting and packing.

Cleanliness is vital here, all waste being cleared.

Main interest lies in the ripening rooms, which are the most modern of their type in use. There are 24 ripening rooms, 12 on each floor of the ripening section in the central bay, with a central corridor running between each set of chambers.

The overhead conveyors run through these central corridors, simplifying the entry and exit of the stems into and out of the rooms. Rooms measure approximately 30 ft. by 15 ft., the construction materials being designed to accommodate the humid heat necessary for efficient ripening.

Floors on the lower level are of

compacted earth covered by sawdust and then by a 3-in. layer of granite chips.

Walls are of clay blocks, absorbing moisture, with insulation material on the perimeter walls; ceilings, each of which carries 650 hooks for stems of bananas, are of specially treated timber lining, to prevent rot.

Upper floors

The upper floor of chambers are similar in construction, except that floors are of treated timber lining instead of earth and granite chips. Spraying of the stems is required, according to needs, and the construction of the chambers permits this to be done with minimum danger of adverse effects to the materials.

Each chamber if equipped with a gas-fired Perl atmospheric burner, thermostatically-controlled, located on the corridor wall, and with a sliding timber 'window' above to allow adjustment of air intake, the heated air being circulated through the chamber by a wall fan, again thermostatically controlled.

On the opposite wall of the chamber there is installed a refrigerating unit, to retard ripening if and when that is necessary.

The ripening routine is planned according to the market requirements, normal policy being to hold the fruit for from three to five days at a steady 65°F.

During this period the green bananas, almost 20% starch, change to a rich golden yellow in the carefully controlled atmosphere and the starch is converted into fruit sugars.

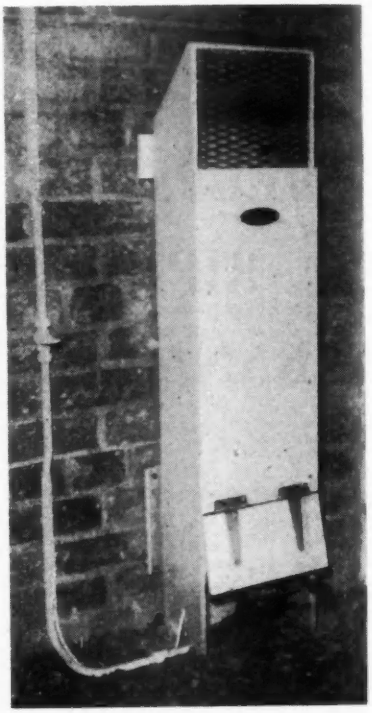
That routine can be varied according to needs of the market, the chambers being flexible in their operation.

Heating for the large cutting and packing section of the central bay is provided by a system of overhead Parkinson-Schwank heaters, which have been found excellent in maintaining comfortable working conditions throughout the area.

Gas heating

For the two-storey office and administration block which fronts the new warehouse, a system of gas-fired low-pressure, hot-water heating, pump accelerated, is in use.

The Scottish Gas Board co-operated in the development of this unusual industrial project and was responsible for the installation of the various units embraced in the warehouse.



A Perl wall heating unit of the type installed at Geest Industries Ltd., Airdrie.

A problem overcome

THE problem of installing lift-off furnaces in buildings with limited headroom can be overcome.

At the Wire Drawers (Midlands) Ltd., Victoria Works, West Bromwich, the furnace bases are placed in a well. Lifting is by a hoist from a beam supported by 'A' frames (One of these can be seen in the photograph).

As can also be seen from the photograph there is enough clearance to move the furnace, inner covers and the spiders loaded with wire.

The plant is being used for stress relieving and annealing of coiled wire and narrow strip, outputs up to 750 lb. per hour of steel wire at a temperature of 700°C, depending upon loading.

Incandescent lift-off furnaces (The Incandescent Heat Co. Ltd., Smethwick, Birmingham) are in use the world over, for ferrous and non-ferrous wire, sheet and strip and for the heat treatment of castings.

AIRLINE COOKS BY GAS

The well-planned and equipped kitchen of the B.E.A. cafeteria, London Airport. Benham & Sons also supplied the ventilating hoods over the equipment.

THE new cafeteria at Hatton Cross, London Airport, opened by B.E.A. last June, is a fine example of industrial catering.

Designed to feed 800, the kitchen was planned and installed by Benham & Sons Ltd., in close consultation with the B.E.A. Catering Department and the Architects, Murray, Ward & Partners.

The large, airy central kitchen is virtually divided into two identical parts, surrounded on three sides by serveries and on the remaining side by wash-up and preparation rooms.

The vegetable preparation room is isolated on the ground floor from which the peeled vegetables are conveyed up to the kitchen on the first floor in mobile tanks by lift.

All the cooking equipment is gas-heated and represents almost every type of cooking equipment manufactured by Benham & Sons. These include two 4-unit 'Solid-top' ranges, two boiling tables, four gas proving ovens, two fry-plates, six pressure steamers, along with grills, cabinet hot closets, roasting oven, stainless steel tables, benches and drainers.

The serveries contain fitted counters complete with tea and coffee making apparatus, drinking water points, and are served from the kitchen by cabinet hot closets.

They serve the three large comfortable dining rooms, in one of which, Benham & Sons have provided a separate beverage counter, completely self-contained, where the B.E.A. staff may obtain tea, coffee or soft drinks.

'GAStronome' asks—

SHOULD YOU SCRAP THAT FRYER?

A modern fryer in an industrial canteen kitchen.

IT would be surprising if an office or factory canteen kitchen could be found anywhere in this country that did not have among its various pieces of cooking equipment a deep-fat frying pan or range of pans.

It is second only in popularity to the cooking range itself which must, because of its flexibility in general use, always hold pride of place in the kitchen.

Such an important appliance as the deep-fat fryer is worthy of special consideration; its value to the kitchen itself in cooking performance, output of food, and economy of fat and fuel needs to be well considered by catering managements, and assessed according to its respective and particular merits.

What standard?

This will doubtless prove that a considerable number of deep-fat frying ranges in use today will fail to justify their continued use. Just how can they be judged and what is the standard of quality and performance with which they must be compared?

I always hesitate to condemn out of hand any cooking appliance just because of a single failing in reaching newly specified high standards. It has only to be recalled that a few years ago food was superior in many respects to that of today, and even sub-standard equipment in the hands of the craftsman cook can often be comparable with the best.

This is true, but even if these do exist there yet remain the golden assets of the time factor, fuel economy and the saving of fat which will vary according to the amount of use and the volume of food put through.

To illustrate how to assess a fryer it is well to create a set of circumstances that could exist in the industrial canteen kitchens and view the results that are obtained. I suggest that 200 meals is a reasonable average, and that the fryer is used to capacity every day of the week.

The peak volume of food that is cooked per day could be chipped potatoes, these being popular not only for their own sake but for their enhancement of so many main foods of the simple type, such as eggs, cold meats, fish and all kinds of 'made-up' dishes.

It so happens that chipped potatoes are a recognised standard in the assessment of the performance of a deep-fat frying pan, not that they are a standard on their own, because potatoes differ in water content, texture and colour, according to the variety and growing area, even differing in the same variety as the storage period lengthens.

Testing measure

Therefore, the standard is flexible but it is the only food available that gives a measure for testing.

The 200 portions required will need approximately 100 lbs. of potatoes and these should be cooked and served in a reasonably short time, so that the flavour of the potato and that slightly crisp exterior and 'floury' inside is produced.

This is only obtained by speed of cooking. I would place a limit of 1½ hours completely to cook the whole of this load, whether it is done by blanching or precooking and finally 'finishing' the potatoes—or by cooking complete in one operation from raw to the finished product.

Frying methods

Cooks will always use their own methods of cooking, some with success, others with mediocrity, but deep-fat frying methods are not really difficult to practise, particularly for chipped potatoes. Precooking or blanching should be done in fat at 280°F. and allowed to remain completely immersed in the hot fat for seven minutes.

They are then removed and left until required, they are then re-immersed, for one minute, this time in fat at 370°F. The result should give a good chip of attractive colour.

This then is a form of kitchen test of performance efficiency. The greater the weight of potatoes that can be cooked in the immersion the higher the rating; and this can be achieved by having a high gas rate to the bulk of fat and giving a high thermal efficiency.

I have cooked with pans that can submerge 14 lb. of potatoes quite easily, but the time taken to cook has been 12 minutes, indeed the weight had to be reduced to 8 lb. before the seven and one minutes time cycle could be obtained.

The sluggish pan means that the cook has to spend long periods working over it, not a very enviable job at the best of times and a great time waster. It also means heavy fat losses, because fat is absorbed into the food when the time factor is extended. There is a further loss when the weight of load is reduced because of the unnecessary amount of fat that has to be heated, but much of this does no effective work, merely vaporising itself away.

Fat losses

Fat losses are usually heavy with inefficient pans and instances have proved savings of four gal. of oil per 5-day week in canteens cooking the 200 portions on efficient equipment.

This means in terms of cash a weekly saving of £3, well worth considering, particularly when seen against the background of better and fresher cooking and easier conditions of working.

A review of pans that can be considered of an accepted high performance shows plenty of equipment using gas, equal and in many cases ahead of that designed for competitive fuels, certainly considerably lower in both capital and running costs.

Among the foremost of these are the fryers of Adams and Sons, with their Starfish, Benham & Sons unit deep-fat fryer; Bartlett's Majestic; Stotts 91R model and Autofry; Modern Metals Hi-Flo; Sumerlings's 664 and Oliver Tom's Frymaster series.

The Frymaster, Majestic and Hi-Flo models all incorporate the high efficiency sloping heat exchanger and all have cool zones. The field of fryers exceeds those enumerated and development proceeds apace.

Having decided upon an improved deep-fat frying service it is strongly recommended that the equipment be used for cooking other foods as well as the time honoured and ever popular fish and chips.

Deep-fat cooking

Meat and fish croquettes, hamburgers and cutlets come to mind. Eggs are excellent cooked in deep fat and do not be put off by people who say that deep-fat frying is a poor method of cooking; that it is fattening to the consumer. With a good fat or cooking oil food cooked rapidly, at the correct temperature, and allowed to drain before being served, is quite all right—except for those who are on fat-free diets.

It is quite usual for some public catering establishments to provide a considerable variety of full-scale meals, using only a deep-fat fryer, griller and a few boiling burners.

Such places are very popular and set the pattern for making the works or office canteen equally popular.

Assess equipment

This can be done, first by assessing the existing frying equipment and then studying the various foods that can be fried.

The cost of a fryer capable of cooking for 200 portions in a reasonable time would be from £90-£120; above 200 a second pan or a large single pan would be a sound investment.

It is wise to err on the side of larger pans when in doubt of the actual capacity. Fat and fuel consumptions are not affected to a great degree. The important total cooking period and the fresh cooking outweigh both of these.

Gas production in the U.S.S.R. in the first quarter of this year totalled 14,460 mill. cu.m., according to the latest report of the U.S.S.R. Central Statistical Board.

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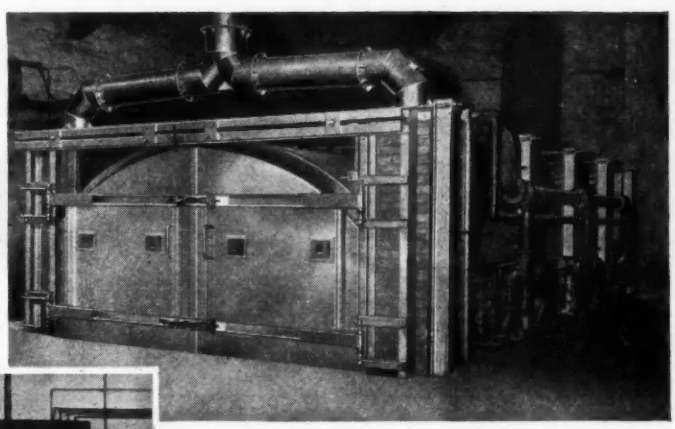

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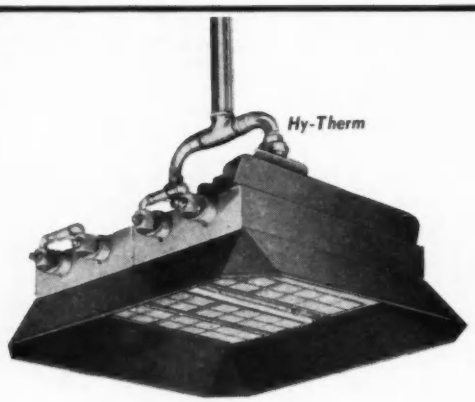

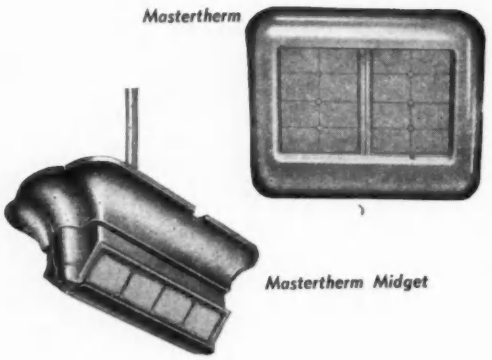

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